

# Improving the Effectiveness of Program Managers

Systems and Software Technology Conference  
Salt Lake City, Utah  
May 3, 2006

## **Outline**

- **Background**
- **Best Practices**
- **DOD Practices**
- **Recommendations**
- **DOD Response**

## Background

### Environment

- Planned investments in DOD weapons systems
  - ★ \$700 billion in 2001
  - ★ \$1.4 trillion in 2006
- Cost of development exceeding estimates by 30-40%
- Fewer quantities purchased than anticipated
- Longer development schedules needed

## Background

# Our Best Practices Work

Leading companies we've visited	Companies' best practices
<ul style="list-style-type: none"><li>■ Motorola</li><li>■ Caterpillar</li><li>■ Toyota</li><li>■ FedEx</li><li>■ NCR Teradata</li><li>■ Boeing</li><li>■ Hughes Space and Communications</li></ul>	<ul style="list-style-type: none"><li>■ Disciplined software and management processes</li><li>■ Prototype testing to improve reliability</li><li>■ Program management practices to encourage collaboration</li><li>■ Requirements that specify reliability and total ownership costs</li><li>■ Collection of metrics data to improve software reliability</li><li>■ Technology readiness levels and design maturity</li><li>■ Statistical control over production processes</li></ul>

# Best Practices' Knowledge Points

<b>Knowledge is gained at key development points during product development</b>	
<b>Knowledge point 1</b>	<ul style="list-style-type: none"><li>■ Match is made between customer's wants and resources (i.e. technology, design, time, and funding)<ul style="list-style-type: none"><li>★ Critical technologies should have reached Technology Readiness Level 7 or higher</li></ul></li></ul>
<b>Knowledge point 2</b>	<ul style="list-style-type: none"><li>■ Product's design demonstrates ability to meet performance requirements<ul style="list-style-type: none"><li>★ High percent of design drawings released to manufacturing</li></ul></li></ul>
<b>Knowledge point 3</b>	<ul style="list-style-type: none"><li>■ Product can be manufactured within cost, schedule, and quality targets and is reliable<ul style="list-style-type: none"><li>★ High percent of production processes under statistical process controls and achieving Cpk of 1.33</li></ul></li></ul>

# Background

## Our Recent Report

- **Best Practices: Better Support of Weapon System Program Managers Needed to Improve Outcomes (GAO-06-110) and Survey of Weapon System Program Managers (GAO-06-112SP)**



- ★ How does DOD support its program managers, and how does it hold them accountable for program outcomes?
- ★ How do leading companies support their program managers, and hold them accountable for program outcomes?
- ★ What can DOD do to better position its program managers for successful outcomes?

## Background

### Our Report's Methodology

- **Case studies of leading companies**
  - ★ Motorola, Siemens Medical Group, Toyota Avalon, Wells Fargo, and Moulson-Coors Inc.
- **Literature reviews**
- **Focus groups**
  - ★ 5 locations, 28 program managers
- **Survey**
  - ★ Category 1 and 2 program managers
- **Interviews**

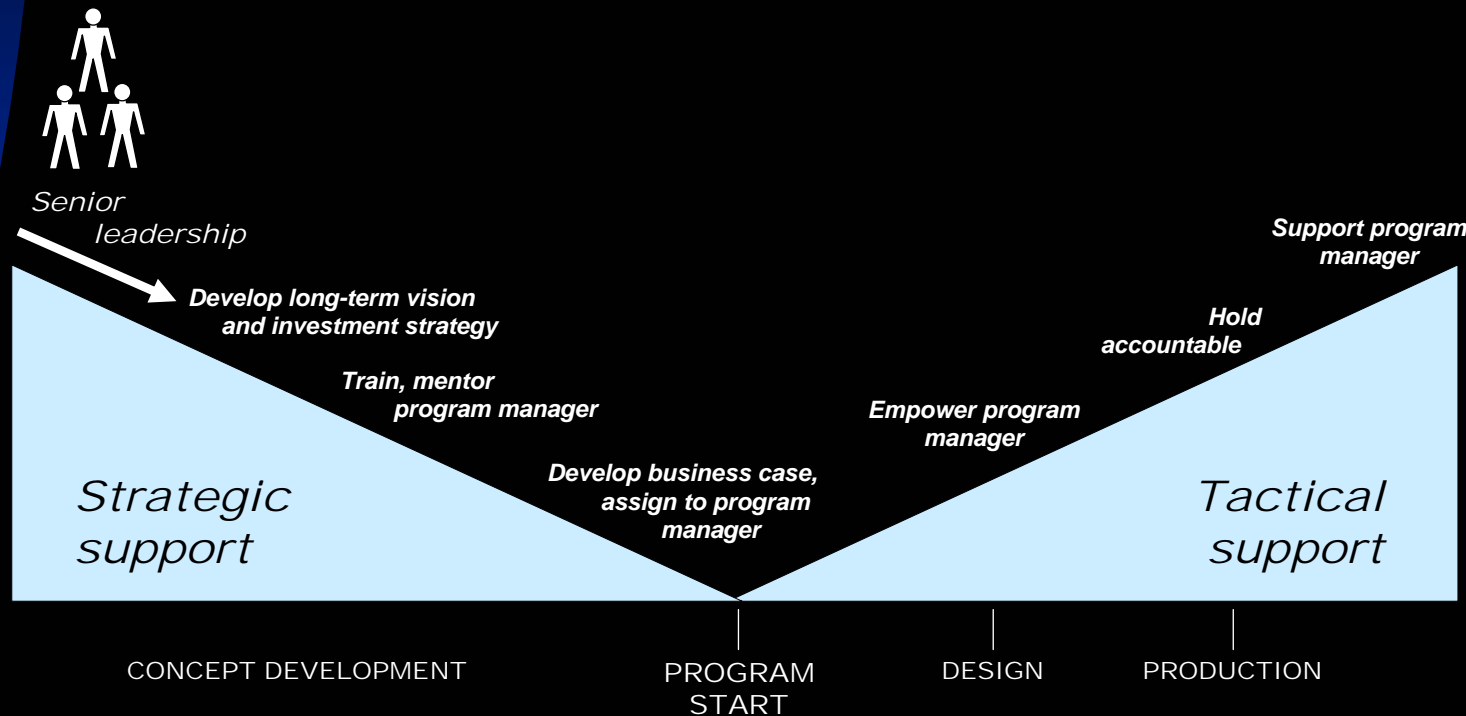
## Success Factors for Program Managers

- Critical support and accountability factors
- Investment strategy
- Business case
- Knowledge-based product development
- Accountability/rewards
- Other success factors



## Best Practices

# Critical Support and Accountability Factors



*Gap between resources and requirements is closed*

*Knowledge-based process is followed; information on cost, schedule, design, and production maturity is demanded throughout*



## Investment Strategy

- Consistent with company strategic vision
  - ★ Corporate leadership accountable
- Forecast market needs
  - ★ Economic trends, market position, technologies
- Long-term and short-term planning
  - ★ Project selection and prioritization make trade-offs that fit within corporate goals

## Business Case

- Match resources and requirements using systems engineering
  - ★ evolutionary product development
  - ★ achievable requirements
    - short cycle times
  - ★ estimate time, money, technologies, people
  - ★ program manager assigned for development duration
- Goal—close gap between customer wants and available resources ***before*** committing to development

# Knowledge-Based Product Development

- Gated process that builds knowledge over time
  - ★ Program manager accountable for execution
  - ★ Frequent reviews, decision point meetings with program manager and senior level managers
  - ★ Management decisions based on data submitted by program manager
    - metrics, such as earned value, percentage of design drawings completed, process controls under statistical control, tests completed
  - ★ Development progress assessed against goals
    - Program managers encouraged to share bad news

# Accountability/Rewards

- Sustained leadership
  - ★ empower—ensure program managers have authority to make decisions based on quantifiable data
  - ★ unwavering commitment to trusted program managers
  - ★ encourage collaboration and communication
- Program manager
  - ★ develop product knowledge
  - ★ meet cost, schedule, performance goals
  - ★ communicate problems and risk
  - ★ implement risk mitigation strategies
- Tenure
- Rewards

## **Best Practices**

### Other Success Factors

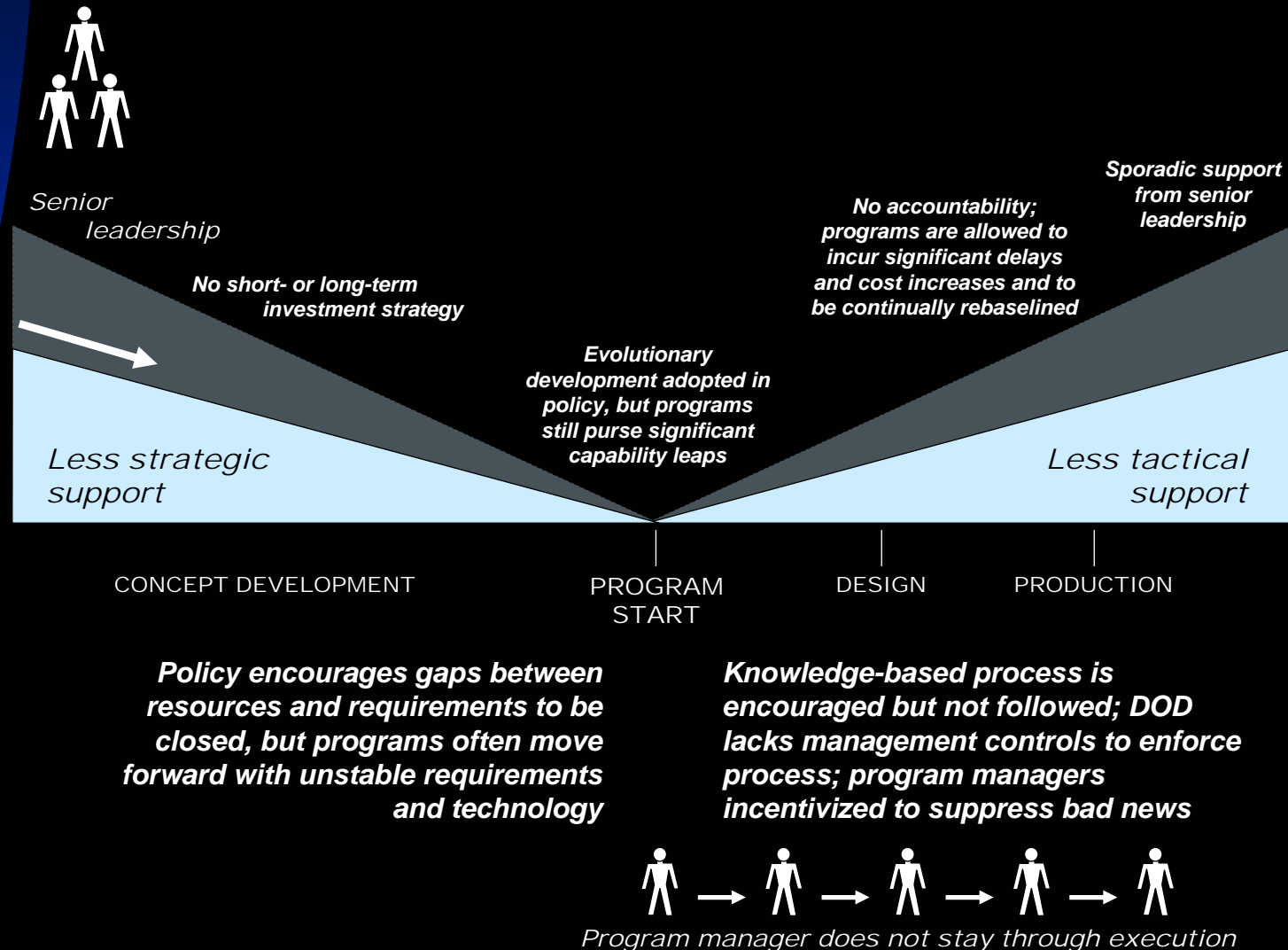
- Disciplined, standard processes
- Lessons learned
  - ★ identify what worked well and what didn't
- Training/mentoring
- Teamwork

## **DOD Practices**

### **DOD Practices**

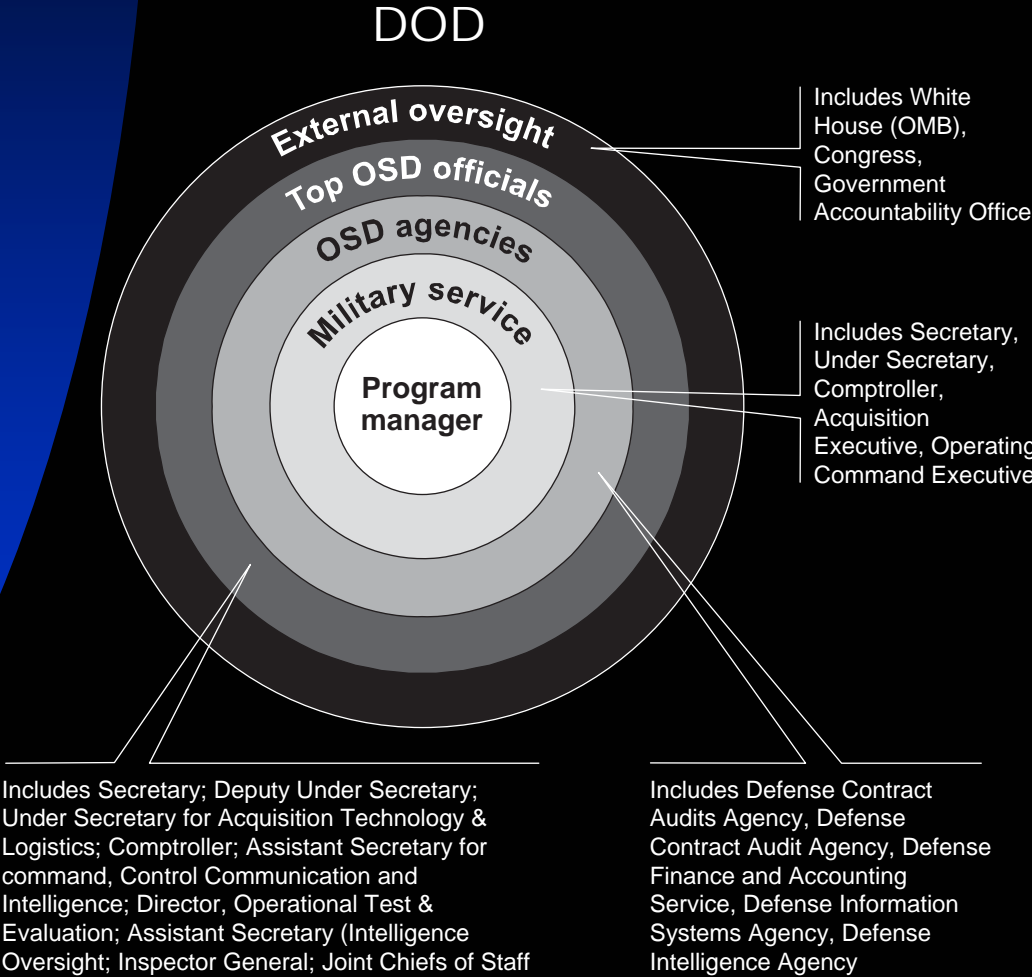
- **DOD program manager environment**
- **DOD layers of oversight**
- **Investment strategy**
- **Business case**
- **Knowledge-based product development**
- **Accountability/rewards**
- **Incentives**
- **Formal vs. informal authority**
- **Obstacles**
- **Authority**

## DOD Program Manager Environment

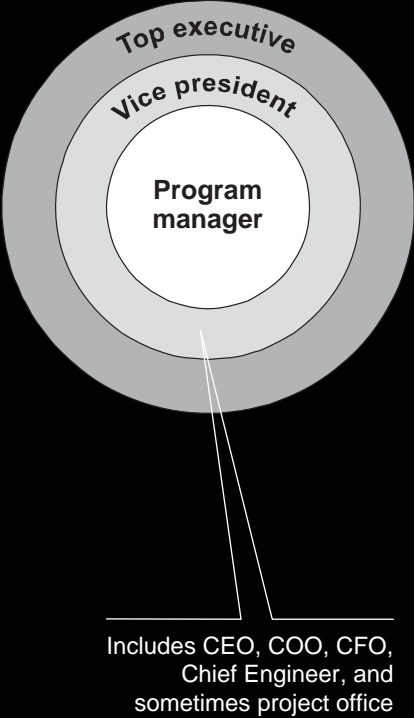




# Oversight Layers



## Best practices



## Investment Strategy

- Overarching investment strategy with senior leader commitment is missing
  - ★ long-term vision, but no defined strategy
  - ★ leadership—many layers
  - ★ short- and long-term investment prioritization is lacking and trade-offs among programs are not made
- DOD starts more programs than it can afford
  - ★ programs compete for funding

## Business Case

<b>DOD policies</b>	<b>DOD practices</b>
■ Match requirements to resources	■ Requirements are rarely stable or matched to resources
■ Divide development into evolutionary blocks	■ Revolutionary development is the norm
■ Use mature technologies	■ Technologies are not mature
■ Provide full funding	■ Unwavering leadership and funding commitment not provided

# Knowledge-Based Product Development

## ■ Policy

- ★ encourages quantifiable data at milestone decision points

## ■ Practice

- ★ data either ignored or not collected
  - percent of design drawings completed less used
  - percent of production processes under statistical controls not required

# Knowledge-Based Product Development (cont'd)

## Low levels of knowledge predict increases in cost:

Program	Percent increase in R&D	Percent of critical technologies mature
ATIRCMS	5.6	50% (3 of 6)
C-5 RERP	2.1	100% (11 of 11)
DD(X) Destroyer	417.3	25% (3 of 12)
Future Combat System	50.8	32% (17 of 52)
Joint Strike Fighter	30.1	25% (2 of 8)

# Knowledge-Based Product Development (cont'd)

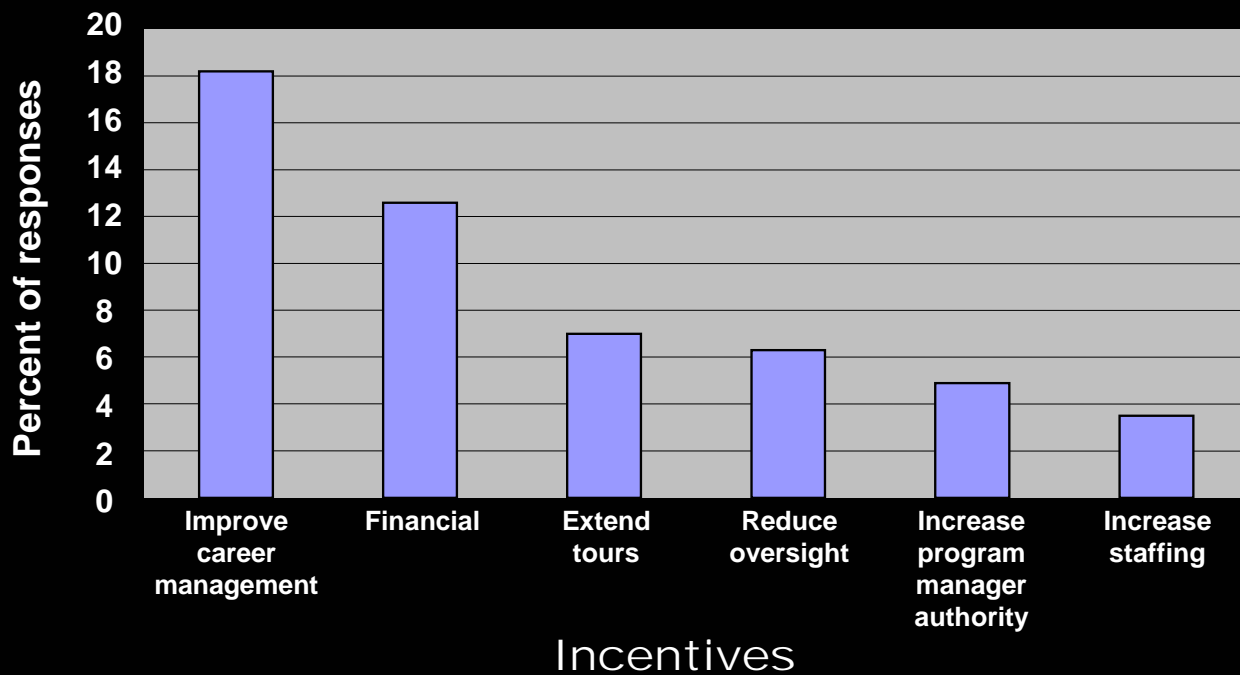
Knowledge-based development processes used to a great extent:		
Processes	Program managers	Program executive officers
Technology readiness levels	32%	23%
Design drawings complete	32%	11%
Statistical control of production processes	26%	14%

# Accountability/Rewards

- **Policy**
  - ★ Program managers accountable for cost, schedule and performance
  - ★ Rewards—intrinsic
- **Practice—Accountability difficult to enforce**
  - ★ Program managers lack authority over requirements and key resources, such as funding and personnel.
  - ★ Program managers have limited tenure
  - ★ Practice lies more in maintaining priority of program than in managing for outcomes

***Program managers: “We can’t be held accountable for what we don’t control”***

## Incentives

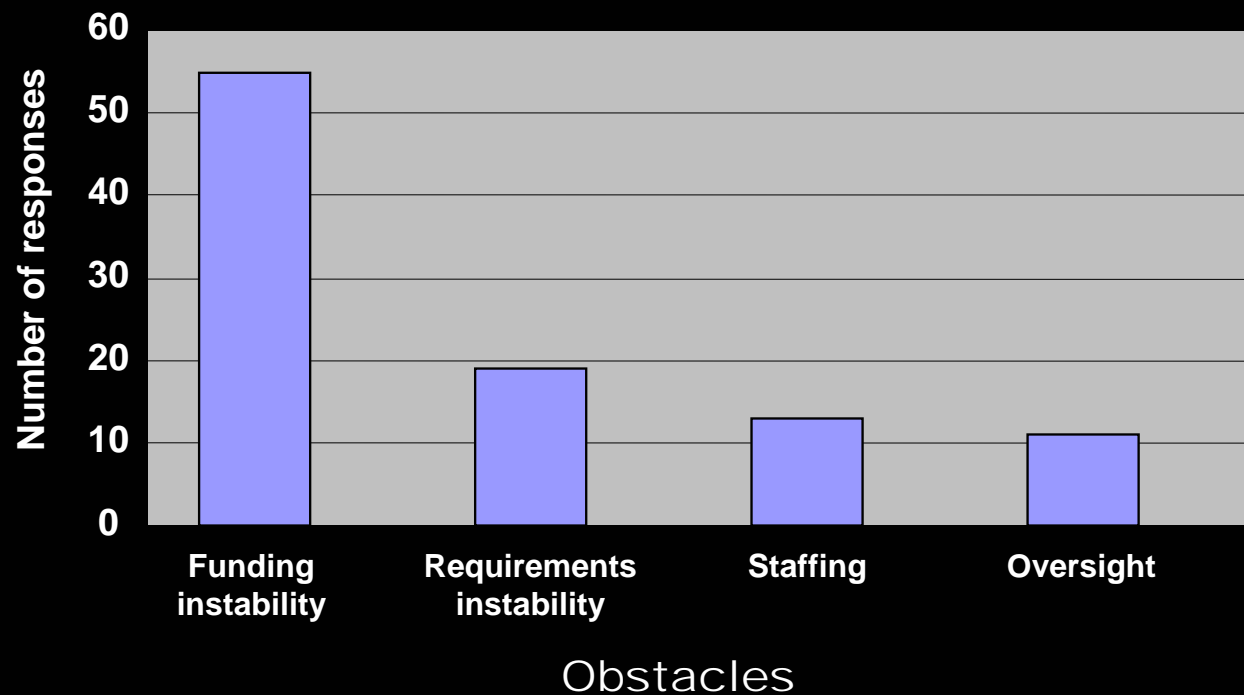




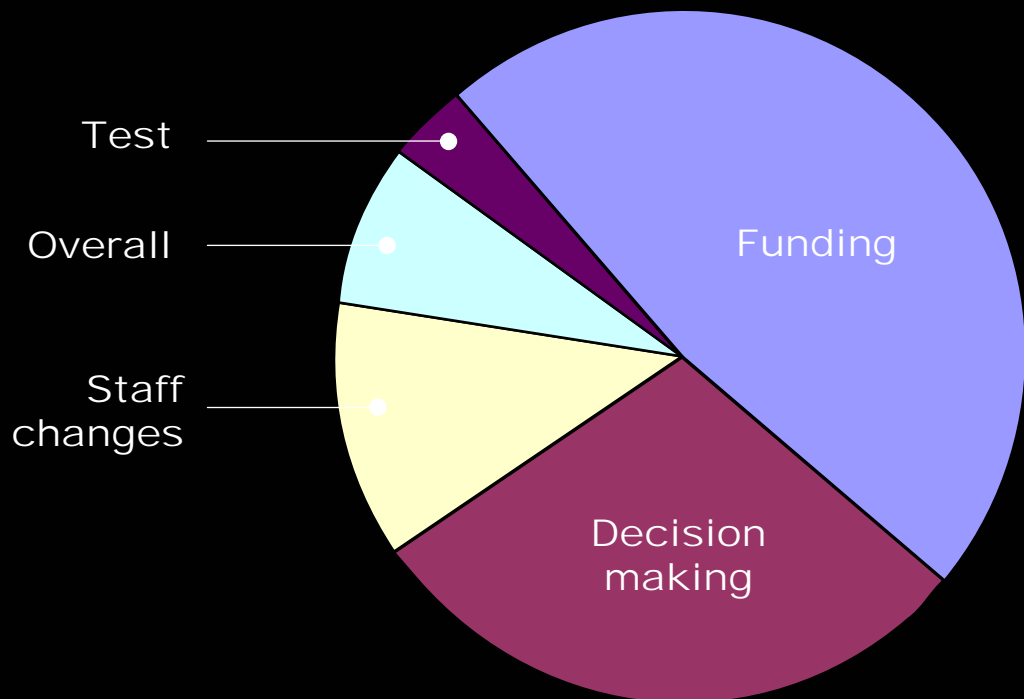
## Formal vs. Informal Authority

<b>Task</b>	<b>% formal authority</b>	<b>% informal influence</b>
Requirements	10	82
Changes to requirements	13	85
Technology development	42	45
Approved program baseline	72	22
Testing requirements	48	49
Request for proposal	85	11
Contractor selection	48	33

# Obstacles to Successful Program Management



# Additional Authority Wanted



# Conclusions

## ■ DOD needs

- ★ a better foundation for program managers and more steadfast support for them once it commits to programs
- ★ a long-term investment strategy that can mitigate risks by separating long-term wants from needs
- ★ a business case for new projects that assures they fit into overall priorities and have adequate resources in terms of time, money and technology

***If DOD implements these things it will have gone a long way to removing incentives for negative behaviors that have plagued many DOD projects.***

## Recommendations

- Develop a long-term and short-term investment strategy
- Senior leaders commit to a business case for each major weapon development by Milestone B
- Develop and implement a process to instill and sustain accountability for successful program outcomes

- **Defense Acquisition Performance Assessment**
  - ★ December 2005—correct government induced instability
- **Quadrennial Defense Review**
  - ★ February 2006—reform business processes

***Whether these efforts will result in improved outcomes depends on implementation and discipline.***

# Q&A